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A NEW GENUS OF FOSSIL MARSUPIALS.

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(Plates IV-VII.)

In 1915, when describing a giant turtle from the Queensland Cretaceous formations, the writer ventured to forecast that, when our areas were better known, novelties rivalling the grotesque monsters of other lands would be exhumed. No new vertebrate material has yet been received from these Cretaceous sources, but remains from the Post-Tertiary deposits on the Darling Downs, which form the subject of this paper, exhibit a large marsupial with remarkable cranial contours. In life this mammal must have been bizarre as a monster in an artist's realm of phantasy. Here is a member of the Nototherium group with a skull the maximum width of which exceeds the maximum length by 46 mm.

This extreme brachycephalous condition is mainly the result of masseteric processes or large inferior lateral extensions of the anterior part of the jugal, which flare widely outwards on each side of the head, almost at right angles to the sagittal plane, at the junction of the infratemporal bar with the zygomatic processes of the maxilla. For reasons to be subsequently set out, it is suggested that this unusual development of the zygomatic arches was associated with the presence of large cheek-pouches.

Diagnosis of New Genus.—The extraordinary development of the inferior lateral processes of the anterior part of the zygomata and the architecture of the very prominent suborbital platform, which acts as a buttress, demand generic recognition. These characters are also associated with a subtriangular upper premolar (dealt with in detail later).

EURYZYGOMA, genus new.

De Vis associated with the mandibles of his *Nototherium dunense* (1887, p. 1065, and 1888, pp. 111-116),* two cranial fragments (Nos. 12622 and 12618) which are obviously of the type of our new material, and which also came

* In this paper references are noted in the manner suggested in a circular recently issued by the Committee of the British Association on Zoological Bibliography.

from the Darling Downs, being heautotypes. These specimens, however, were too incomplete to suggest to De Vis the immense accessory processes. Sufficient of the anterior zygoma root is present to show the special characters of *Euryzygoma*. It would therefore be unwise to give our material a new specific name. In the circumstances, it is necessary to use De Vis's specific name in conjunction with the new genus.

EURYZYGOMA DUNENSE.

Material.—This consists of a cranium which was received in over seventy pieces. The maxilla and premaxilla were practically the only parts which were intact. Fortunately the bones were in excellent condition, not being decomposed, and as many of the fractures were obviously made in bringing the remains to light, the zygomatic arches, with their inferior lateral processes, and the main portion of the superior cranial contours have been united without any doubt as to their real position. The fitting together of the smaller pieces, especially in the basioccipito-sphenoidal region, however, demanded infinite patience. Practically no reconstruction was necessary, the actual bones themselves supplying the natural contours, and it has been deemed inadvisable to fill in the comparatively unimportant missing parts. The full molar series is present on each side, but the incisors have been lost *post mortem*.

The specimen was probably a fully mature male. Many of the cranial sutures are ankylosed to extinction. Reg. No. F 1327.

Locality.—The cranium was discovered in sandy soil at a depth of about 70 feet at Brigalow, Darling Downs, Queensland, when a well was being sunk on the property of Mr. G. A. F. Kleidon, who subsequently donated the fragments to the Queensland Museum. On behalf of this institution it is my pleasant duty heartily to thank Mr. Kleidon, and also Mr. Wilson who forwarded the pieces. It is to be hoped that this handsome donation will be supplemented later by remains from this district demonstrating an association of bones.

Description.—The maximum length of the cranium "between uprights" (condyles to gnathion) is 634 mm.; the maximum breadth across the zygomatic processes is 680 mm.; the maximum height (between parallels from the bregma and the inferior border of the zygomatic processes) is 343. The calvarium is dwarfed by the extraordinary development of the zygomatic arches and processes. The breadth of the occiput (calculated from the fairly complete left moiety) is approximately 290 mm. The occipital region, which is somewhat concave, with a median vertical ridge, slopes forward at an angle of 45° to the plane of the bony palate. Posteriorly the lambdoid crest is broadly convex. From the lambdoid crest, the superior contour of the calvarium along the

Euryzygoma dunense; lateral view.
Approximately one-fifth natural size.

Photo.—H. W. Mobsby.

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sagittal suture to the fronto-nasal depression is practically a straight line, which is parallel with the plane of the bony palate. There is no parietal platform, and the cranial walls, when losing their curves of contact with the occiput, slope in straight lines to their fractures. In the mid-parietal region these walls form an angle of 50°. The lower moieties of the lateral walls are missing.

On the dorsal surface the sutures between the parietals and frontals are obscured. In this area the sagittal crest bifurcates, as in *Phascolarctus*; the frontals rapidly widen and when in line with the inferior zygomatic processes they attain a breadth of 148 mm. This breadth is apparently continued (contours incomplete) through the course of the fronto-nasal depression. The concavity of this depression is wide, the sides and posterior wall sloping sharply to the main frontal platform. The course of the fronto-nasal sutures cannot be traced with accuracy. The terminal areas of the frontal bones are slightly rugose on the slope of the depression, and there are a few very small nutrient foramina. A small horn or frontal boss may have been attached here (*cf.* Scott & Lord, 1920).

Nasals.—From the frontal depression the nasals reach almost to a point above the gnathion. Except for a slight convexity, which is double in the anterior region where the median suture is open, they are surprisingly flat on their upper surface, which projects forward at an angle of about 18° to the plane of the bony palate. Their course does not appear to be curved, or to terminate in a deflected obtuse apex. The left-hand moiety is perfect anteriorly, and is 88 mm. in width. A right-hand fragment is sufficient to give fair evidence of symmetry, and the approximate width would thus be 176 mm. There is no evidence whatever of the presence of bony studs, of which Scott and Lord have made interesting studies in Tasmanian material (*N. mitchelli*), or of attachments for a horn, as first suggested by Macleay in his original description of "Zygomaturus trilobus" in 1857 (quoted by Owen, 1859, p. 169).

The lateral portions of the naso-maxillo-premaxillary region are, unfortunately, too incomplete to be correctly allocated, and it has been thought inadvisable to restore the missing parts. It is evident that the anterior portions of the nasals projected clear of lateral supports for a distance of at least 75 mm. Fragments of the sides, and especially one piece exhibiting the maxillary-nasal suture, show the great strength of the bones supporting the main nasal arch. On the inner median surface of the nasals, near the suture with the frontals, may be seen two large sub-contiguous channels, 11 mm. wide and 5 mm. deep, and these extend towards the anterior extremity where they are merged in the general concavity of the inner tables.

Zygomatic Arches.—These are fairly symmetrical. Part of the ventral border of the left arch is missing, and the right inferior lateral process is incomplete in its inner contours, but fortunately the opposite bones are in excellent condition. The dorsal or superior border of the squamosal element of the arch is at first shortly concave when leaving the occipital region, being then slightly and evenly convex until the downward sweep of the orbit is reached. The inferior or jugal border is much more robust, attaining a thickness of 56 mm. where the jugal approaches the glenoid cavity. In this respect the cranium resembles the relationship of these parts in *Phascolarctus*, the posterior extension of the jugal being a primitive condition.

The squamosal element appears to be produced anteriorly to a greater extent than is to be found in either *Phascolarctus, Phascolomys,* or *Macropus,* and sends a V-shaped strip of bone as far down as the mid-region of the orbit. The line of demarcation between the squamosal and jugal bones can be readily traced throughout the arch. The height of the arch opposite from the fronto-parietal suture is 130 mm., the squamosal element here having the greater share. The walls are not vertical, but sweep outward as they gain depth; in fact, a section taken through the arches in the mid-parietal region would show, with the contours of the occiput behind, a slightly flattened semicircle, the radius of which would be about 8 inches. The maximum width of the zygomata, apart from the outstanding processes, is 415 mm.

W. K. Parker (1886) pointed out that an inordinately large squamosal is characteristic of the Marsupialia. In the arch of *Euryzygoma* this bone reaches its maximum development. It is to be regretted that the squamous plate is missing and that its extent on the walls of the cerebral chamber cannot be traced. In the Marsupialia this plate reaches its maximum in *Wynyardia bassiana.* (Baldwin Spencer, 1900, p. 779).

Owing to the incompleteness of the cranial walls the width of the temporal fossa cannot be accurately estimated, but in the mid-parietal region it was evidently about 65 mm., widening somewhat anteriorly. The facial portion is elongated, as may be seen from Plate V, and the width averages 77 mm. The orbits are low, but not to the same extent as in *N. mitchelli,* being 90 mm. above the alveolar margins of the molars. Although the outer margins of the orbits are more posteriorly placed than is the case in *N. mitchelli,* there would have been little scope for lateral vision, and *Euryzygoma* evidently went through its world viewing only the region immediately in front.

A slight prominence on each side of the orbit, situated at the origin of the suture between the jugal and the squamosal, indicates rudimentary postorbital processes. Part of the inner margin of the orbits and the lachrymals are missing.

Photo.—H. W. Mobsby.

Eurvzygoma dunense; frontal view.

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Inferior Lateral Processes.—Across the processes the extreme breadth is 680 mm. On the left-hand side the maximum transverse diameter of the inferior lateral process is 231 mm. The vertical height of the process in its lateral extension beyond the arch is 121 mm. The maximum thickness is 47 mm. The extreme height of the combined elements, from the superior border of the squamosal to the inferior border of the vast processes (taken from parallels) is no less than 285 mm. When the cranium is resting on the inferior borders of the processes the molar series are 64 mm. above the surface. This downward development is surpassed by the inferior processes of *Mylodon*, but in that mammal there are no lateral extensions.

The processes flare outward almost at right angles to the sagittal plane, as may be seen from Plate V. They are not, however, straight, but slightly curved, the lateral margins being in advance. There are prominent rugose areas on the superior border of these processes, just at the origin of their lateral extensions, these being doubtless for the attachment of parts of the masseteric muscles.

The origin of the zygomatic process of the maxilla is primarily a vertical plate which abuts on practically the whole of the vertical face of the maxilla, commencing parallel with the anterior lobe of the third molar, and being about 30 mm. in thickness; this is supported above by the horizontal orbital plate 14 mm. thick, *which is produced anteriorly at right angles to the vertical constituent*, forming a triangular platform which is continuous behind with the superior border of the maxilla: this horizontal orbital platform unites the vertical plate with the strong convex bar which forms the lower border of the orbit, and through the inner root of which the large infra-orbital foramen passes. The lateral extension of this bar forms a strong supporting buttress for the accessory processes. With the exception of the suborbital bar, the whole pier is composed of maxillary elements, but the sutures at the orbit cannot positively be traced, owing to fractures. The whole architecture of this part of the skull is quite unlike the piers of the zygomata in Macleay's cast, and is also absolutely distinct from other cranial fragments in the Queensland Museum attributed to *N. victoriæ*. The deep rectangular suborbital recess is a marked feature.

Of the extreme width of the accessory process, the maxilla forms less than one third. The zygomatico-maxillary sutures on the anterior surface are produced laterally to a far greater extent than are those on the posterior surface, giving the maxillary element, as illustrated in Plate V, a greater proportion than really exists. It may here be noted, as W. K. Gregory (1910, p. 221) has pointed out, that many of the cranial bones of marsupials are very oblique in their areas of contact.

Maxilla and Molars.—The bony palate is well preserved and there are no signs of fenestrations. The floor is slightly concave transversely, with a median

ridge. At the border of the mesopterygoid fossa there is a prominent transverse ridge, through which a foramen runs on each external corner. The average depth of the palate below the alveolar margins is 7 mm.

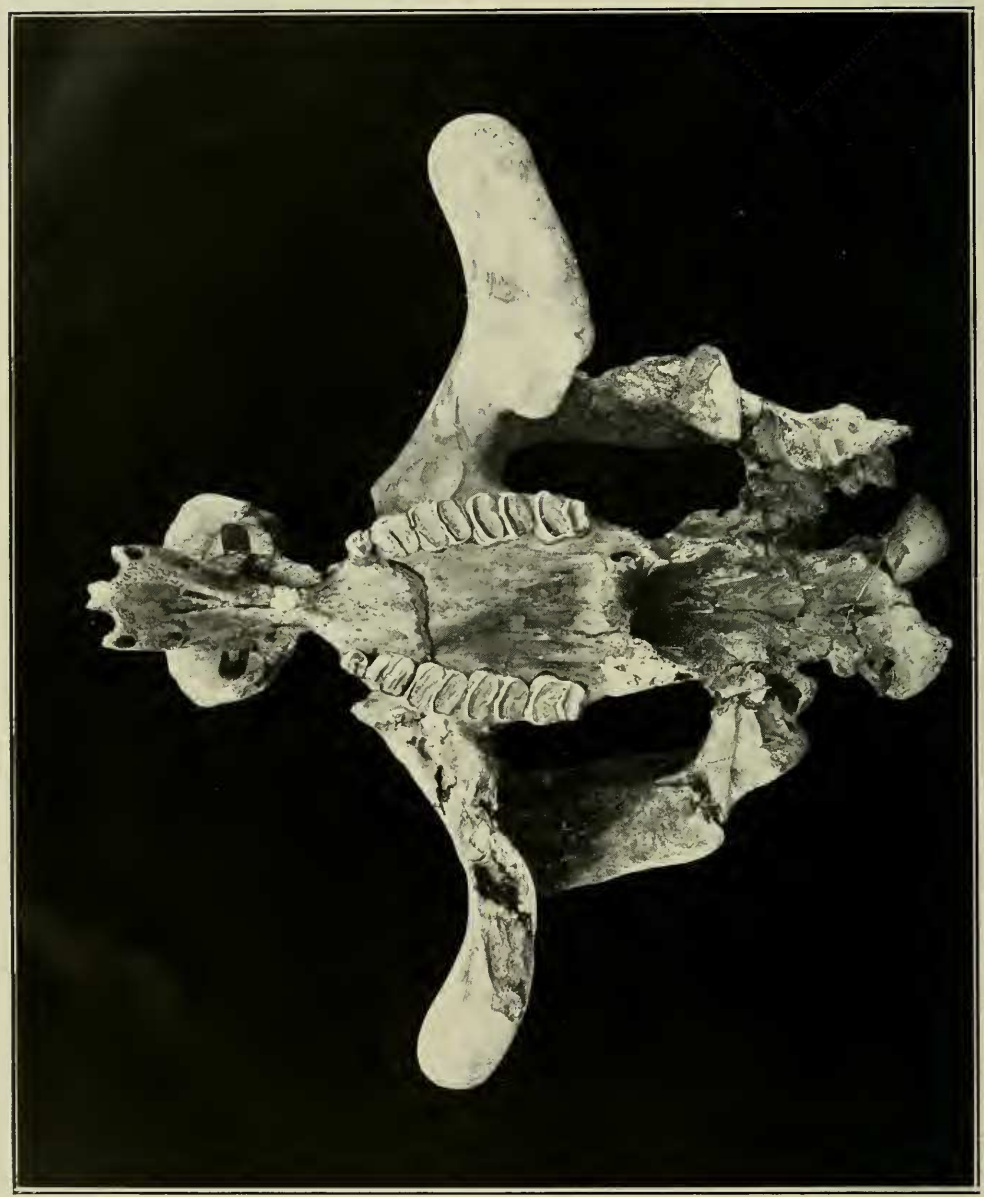
The molar series are in symmetrieal arcs, the lobes of the teeth being obliquely set. Fortunately all the teeth are *in situ*.

Premolar: The premolar is subtriangular: length 20 mm., breadth 18 mm. There is a single oblique transverse lobe, on which a wide tract of dentine with a posterior loop is exposed. This has evidently been worn from a single central cusp with a median posterior depression. There is a narrow posterior talon, the lingual border of which is continuous on the inner side with an anterior talon on the contracted front angle of the tooth. This premolar agrees well with that described by De Vis (1888, p. 115) as typical of his *N. dunense* and also illustrated in his accompanying Plate. Both teeth are well preserved in our specimen, and no special differences are to be noted between them. The relations of the premolar with those of other Nototheres are commented on elsewhere.

Molars: The bilophodont molar series is well worn, a tract of dentine 8 mm. wide being exposed on the hind lobe of m^4. From m^1 to the front lobe of m^3 the series gradually increases in size. The posterior lobe of m^3 is less wide than the anterior. M^4 is anteriorly slightly less wide than the corresponding lobe of m^3, and the hind lobe is markedly narrowed. Anterior and posterior talons are well developed throughout, exeept in the first true molar, where demarcations are lost in the surfaces of wear. The anterior talons on the seeond, third, and fourth molars are more developed on the lingual surface, whereas the posterior talons are more prominent labially, this being in consonance with the oblique setting of the lobes. On the lingual side the valleys between the lobes are bounded and partly closed by a tubercle arising from cingular processes, but these are not so marked on the outer side.

Dimensions.	mm.
Antero-posterior diameter of molar series with pm^4, right	172
Antero-posterior diameter of molar series with pm^4, left	169
Width of m^1, anterior lobe	28
Width of m^2, anterior lobe	35
Width of m^3, anterior lobe	36.5
Width of m^4, anterior lobe	35
Palate breadth between outer corners of pm^4	102
Palate breadth between outer corners of m^3, front lobe	158
Palate breadth between outer corners of m^4, hind lobe	152
Palate breadth between inner corners of pm^4, front lobe	64
Palate breadth between inner corners of m^3, front lobe	85
Palate breadth between inner corners of m^4, front lobe	90
Diastema	112
Palatal length,* palation to gnathion	390

*Oldfield Thomas, Nomenclature of Measurements, Proc. Biol. Soc. Wash., xviii, p. 192, 1905.



Eurygoma dunense; ventral view.

Photo.—H. W. Mobsby.

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The maxilla extends anteriorly on the floor of the palate for a distance of 110 mm. beyond the premolars. The palate is here convex with a median groove. The lateral sutures between the maxilla and the premaxilla cannot be satisfactorily traced.

Premaxilla.—Euryzygoma dunense is relatively longer in the facial region than is the cast of the cranium described by Macleay. The gnathion is 187 mm. from the anterior borders of the premolars. The diastema is 112 mm. In section the premaxilla is subquadrate. Owing to fractures its union with the nasals is missing on both sides. On its palatal surface it is concave in the region between the two posterior incisors, where there are three small foramina. The premaxilla is thickened anteriorly and its superior margin terminates in a raised oval boss, which suggests an attachment for cartilage. At the alveoli of the large first incisors the width is 74 mm., and the height is 101 mm. The incisors have been lost, *post mortem*, but the dimensions and disposition of their cavities give valuable evidence of their nature. The large anterior pair were evidently strongly curved in their downward course, and were subcylindrical and only slightly diverging. At the antero-inferior border the alveoli are separated by a distance of 19 mm. A loose incisor, 23 × 29 in diameters, from another specimen, fits fairly well into either cavity. On the anterior surface of the premaxilla there are extensive exposed alveolar surfaces. The alveolus of the second incisor, which is contiguous with that of the first on the labial border, is approximately 13 × 11. The third incisor alveolus is placed on the labial border about 15 mm. behind that of the second, to which it is subequal. It is evident from its contours that the third incisors were obliquely set and procumbent in position.

For purposes of description the premaxilla has been treated as a single and not as a paired bone.

Glenoid Fossa.—Although the postglenoid process is very incomplete, the actual fossa is well preserved on the right-hand side. This is 102 mm. in length, whilst the actual concavity, apart from its shelving anterior border, is 15 mm. Some idea of the articular surface of the mandibular condyle may be gauged from these dimensions. The plane of the fossa is set at an angle of 85° to the median line of the cranium, the condyle thus being scarcely oblique in its setting. Laterally the posterior extension of the jugal forms part of the shelving anterior border of the fossa.

Basal Bones.—The basioccipital and basisphenoid have been greatly fractured, about fifteen segments forming the contours which have been put together. The combined bones slope upwards at an angle of 18° from the plane of the bony palate, being 12° less than the angle noted by Owen for the cast of

Nototherium. From the palation to the basion the distance is 220 mm. The aperture of the posterior nares at the palation is 53 mm. deep and about the same in width. The posterior borders of the mesopterygoid fossa are incomplete, but there was a depth of at least 65 mm. The walls of the fossa expand somewhat in their course from the maxillary region. In section the fossa is U-shaped. The external walls are marked with very prominent tubercules for muscle attachments. On each side a large entocarotid foramen is to be seen, which perforates the floor of the basisphenoid and enters the inner tables between the Gasserian grooves, its course having been cleared on the left-hand side.

The sutures between the basioccipital and basisphenoid on the inferior surface can be traced at a distance of 83 mm. from the basion. The inferior surface of the former bone is deeply concave, with a strong longitudinal ridge. In its advance from the foramen magnum the bone somewhat narrows in breadth.

The contours of the foramen magnum are not quite complete. The transverse section is oval, with diameters (approximately) of 65 × 35. Both condyles are present, but only the right can be conjoined with its natural surface. Its diameters are: Maximum length 78 mm.; extreme breadth 42 mm. Unfortunately the lateral elements of the occiput are largely missing.

The prominent condylar foramina are paired, being subequal, and externally the openings are separated by a distance of 7 mm. It has been suggested that the accessory foramen is homologous with those of the *Creodonta*.

Interiorly the basioccipital and basisphenoid form a level platform about 65 mm. in width, but the supero-lateral elements are missing. On the external border of the former may be seen, at the fractures, part of a large groove which probably corresponds with the inner border of the jugular foramen.

There are prominent grooves, slightly diverging anteriorly, for the accommodation of the Gasserian ganglion; from the grooves posteriorly the position of the foramen rotundum is barely indicated on each side. Anteriorly the basal bones are incomplete, and the whole ethmoid region is missing.

In the mature cranium of *Phascolomys* the cranial walls are greatly thickened in the supra-occipital region, and large sinuses are present which are not to be found or are but slightly developed in *Macropus* and *Phascolarctus*. Our fossil resembles the wombats (*Phascolomys*) in this respect. The walls of the cranium are surprisingly thick in this area and large sinuses are present.

The internal tables of the cranium, in so far as they are available for description, exhibit irregularities in the region of the sagittal suture. There is an irregular median ridge, which is much distorted in the mid-parietal region, probably associated with a sinus. The crania of many marsupials are much thickened in the sagittal region. Anteriorly there is evidence of large frontal sinuses.

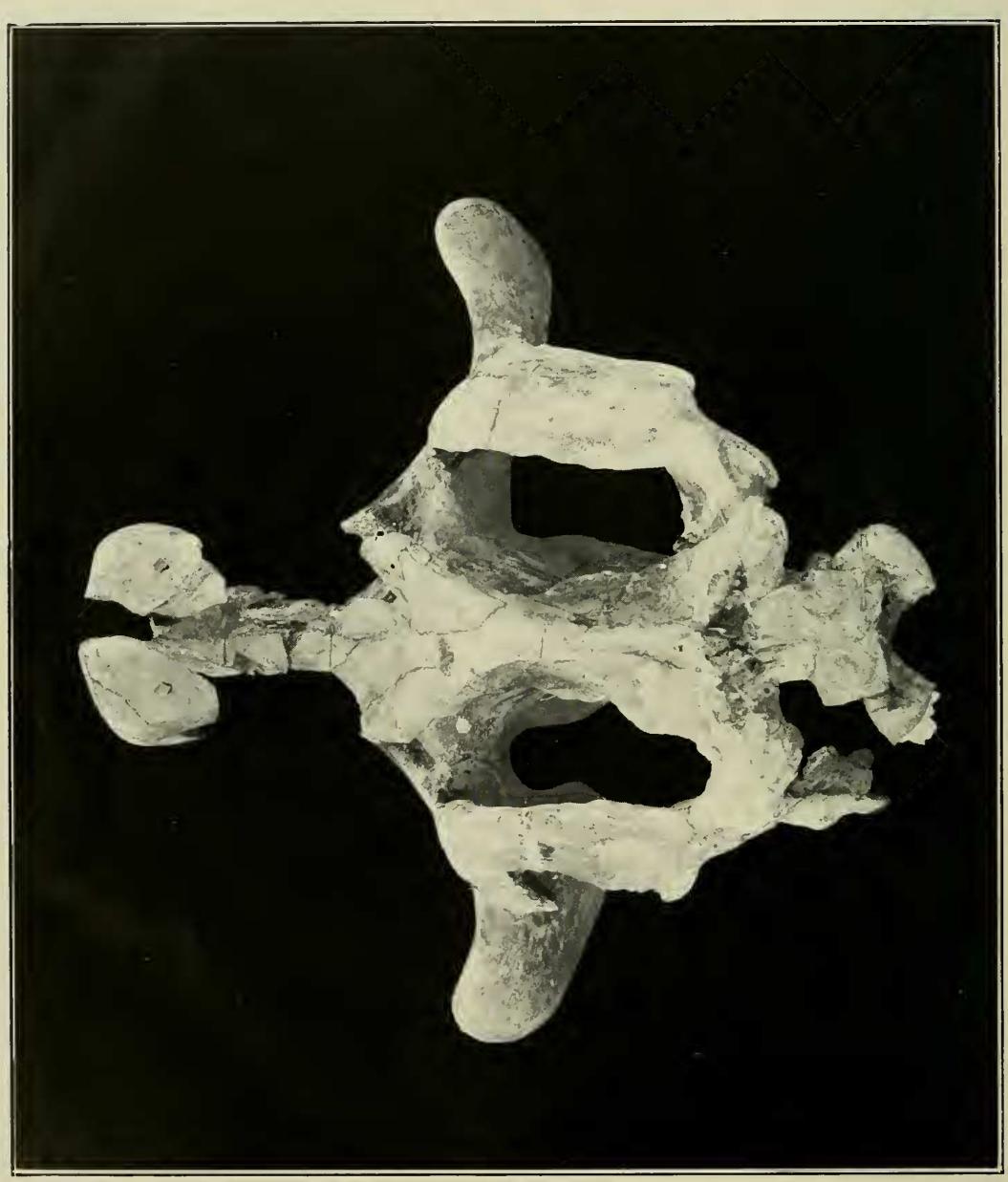

Photo.—H. W. Mobsby.

Eurzygoma dunense; dorsal view

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